

**IN THE SPECIFICATION:**

*Please amend the paragraphs starting on page 3, line 23 through page 6, line 29 as follows:*

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Accordingly in a first aspect the invention consists in a breathing assistance apparatus adapted to deliver humidified ~~gases~~ gas at a desired level of humidity or at a desired temperature to a patient using open loop control comprising:

~~humidification means~~ a humidifier having an electrical input power and capable of humidifying said ~~gases~~ gas up to a level of humidity prior to delivery to said patient, said level of humidity depending on said input power to said ~~humidification means~~ humidifier,

~~transportation pathway means for conveying said humidified gases from said~~  
~~humidification means to said patient, and~~

~~control means~~ a controller or processor including stored instructions configured or programmed to:

- (a) determine a parameter relating to the flow rate of said ~~gases~~ gas through said apparatus;
- (b) determine based on at least said parameter the required electrical power input to said ~~humidification means~~ humidifier to deliver said ~~gases~~ gas to said patient at a level of humidity or at a temperature substantially similar to said desired level of humidity or said desired temperature;
- (c) supply as said input power to said ~~humidification means~~ humidifier a level of power substantially similar to said determined power input to said ~~humidification means~~ humidifier;
- (d) continuously monitor said parameter ~~or said variable~~, and when a change in said parameter ~~or said variable~~ is greater than a first threshold, indicating a change in

the flow rate of said ~~gases gas~~, said ~~control means~~ controller or processor reverts to said instruction (a).

Preferably when a change in said parameter ~~or said variable~~ is greater than a second threshold indicating said ~~control means~~ controller or processor reverts to instruction (b), said second threshold relating to a lesser change in the flow rate than said first threshold.

Preferably said breathing assistance apparatus further comprises:

a conduit configured to convey said humidified gas from said humidifier to a patient,

~~pathway heating means~~ a conduit heater having an electrical input power, and being associated with said ~~transportation pathway means~~ conduit wherein the ~~gases gas~~ flowing through said ~~transportation pathway means~~ conduit are heated either directly or indirectly by said ~~pathway heating means~~ conduit heater whereby the level of heating depending on said input power to said ~~pathway heating means~~ conduit heater;

an ambient temperature sensor providing an indication of the exterior temperature or said controller or processor storing an assumption of the exterior temperature used as an indication of the exterior temperature; and said instruction (b) further comprises determining based on at least said indication of the exterior temperature the required power input to said ~~pathway heating means~~ conduit heater to deliver said ~~gases gas~~ to said patient at a level of humidity or at a temperature substantially similar to said desired level of humidity or said desired temperature;

and said instruction (c) further comprises supplying as said input power to said ~~pathway heating means~~ conduit heater a level of power substantially similar to said determined power input to said ~~pathway heating means~~ conduit heater.

Preferably said first threshold relates to the rate of change of said parameter ~~or said variable~~ with respect to time, wherein when said rate of change is greater than said first threshold said ~~control means~~ controller or processor reverts to said instruction (a).

Preferably if said rate of change or said change in said parameter ~~of said variable~~ indicates a decrease in flow said ~~control means~~ controller or processor pauses for a first delay before said ~~control means~~ controller or processor reverts to said instruction (a) and if said rate of change or said change indicates an increase in flow said ~~control means~~ controller or processor pauses for a second delay before said control means controller or processor reverts to said instruction (a), said second delay being longer than said first delay.

Preferably said ~~control means~~ controller or processor monitors said input power supplied to said ~~pathway heating means~~ conduit heater to provide an indication of the resistance or temperature of said ~~pathway heating means~~ conduit heater.

Preferably said indication of the temperature or resistance is used by said ~~control means~~ controller or processor at least in said instruction (d) as said parameter relating to the flow rate of said ~~gases~~ gas.

Preferably said input power to said ~~pathway heating means~~ conduit heater comprises a voltage signal and a current signal, and said indication of the temperature or resistance relates at least in part to said voltage signal and/or said current signal and said input power to said ~~pathway heating means~~ conduit heater.

Preferably said ~~breathing assistance apparatus~~ humidifier comprises a humidification chamber adapted to receive a volume of water and ~~water heating means~~ water heater to heat said water to produce water vapour within said chamber in use, said ~~gases~~ gas passing through said water vapour in said chamber thereby being humidified, said instruction (a) further comprising:

- i) energising said ~~water heating means~~ water heater to heat said water towards a first condition,
- ii) continuously monitoring said parameter or a variable indicative of a property of said ~~water heating means~~ water heater, until said variable or said parameter indicates that said water has substantially reached said first condition,
- iii) determining said parameter based on at least said variable and said indication of the external temperature.

Preferably the determination of said power to said ~~humidification means~~ humidifier in said instruction (b) is also based on said indication of the external temperature.

Preferably said breathing assistance apparatus further comprises a ~~gases~~ gas supply means adapted to supply ~~gases~~ gas to said ~~humidification means~~ humidifier at a required pressure and resulting flow rate.

Preferably said ~~gases~~ gas supply means provides an output signal representative the level of electrical output to said ~~gases~~ gas supply means, said signal being supplied to said ~~control means~~ controller or processor from which the flow rate of said humidified ~~gases~~ gas is determined.

Preferably said ~~gases~~ gas supply means comprise a fan driven by a variable speed electric motor.

Preferably said ~~estimate of the flow rate of said humidified gases~~ parameter is based on the current drawn by said variable speed motor.

Preferably said breathing assistance apparatus further comprises a ~~gases~~ gas flow rate sensor from which said ~~estimate of the flow rate of said humidified gases~~ parameter is determined directly.

Preferably said ~~breathing assistance apparatus~~ humidifier further comprises:

a chamber ~~sensing means~~ sensor providing an indication of the temperature of said ~~water heating means~~ water heater and providing an indication of the electrical power drawn by said ~~water heating means~~ water heater,

wherein said variable is indicative of said indicator of the temperature of said ~~water heating means~~ water heater or said indication of the power drawn by said ~~water heating means~~ water heater.

Preferably said parameter at least in said instructions (a), (b) and (c) is defined as the value of said power drawn by said ~~water heating means~~ water heater divided by said temperature of said ~~water heating means~~ water heater.

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*Please add the following paragraphs after line 29 on page 6:*

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In a second aspect a method of delivering humidified gas at a desired level of humidity or at a desired temperature to a patient using an open loop controlled humidifier comprising the steps of:

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- (a) determining a parameter relating to the flow rate of said gas through said humidifier;
  - (b) determining based on at least said parameter the required electrical power to said humidifier to deliver said gas to said patient at a level of humidity or at a temperature substantially similar to said desired level of humidity or said desired temperature;
  - (c) supplying a level of power to said humidifier substantially similar to said determined power;

(d) continuously monitoring said parameter, and when a change in said parameter is greater than a first threshold, indicating a change in the flow rate of said gas, revert to step (a).


Preferably said method further comprising: when a change in said parameter is greater than a second threshold indicating said controller or processor reverts to instruction (b), said second threshold relating to a lesser change in the flow rate than said first threshold.

Preferably said method further comprising the steps:

conveying said humidified gas to a patient

heating the conveyed gas either directly or indirectly using a conduit heater;

sensing or making an assumption of the exterior temperature;

 and said instruction (b) further comprises determining based on at least said indication of the exterior temperature the required power input to said conduit heater to deliver said gas to said patient at a level of humidity or at a temperature substantially similar to said desired level of humidity or said desired temperature;

and said instruction (c) further comprises supplying as said input power to said conduit heater a level of power substantially similar to said determined power input to said conduit heater.

Preferably said first threshold relates to the rate of change of said parameter with respect to time, wherein when said rate of change is greater than said first threshold said controller or processor reverts to said instruction (a).

Preferably said rate of change or said change in said parameter indicates a decrease in flow said controller or processor pauses for a first delay before said controller or processor reverts to step (a) and if said rate of change or said change indicates an increase in flow said

controller or processor pauses for a second delay before said controller or processor reverts to step (a), said second delay being longer than said first delay.

Preferably said method further comprising the step of monitoring the input power supplied to said conduit heater to provide an indication of the resistance or temperature of said conduit heater.

Preferably said indication of the temperature or resistance is used at least in step (d) as said parameter relating to the flow rate of said gas.

Preferably said input power to said conduit heater comprises a voltage signal and a current signal, and said indication of the temperature or resistance relates at least in part to said voltage signal and/or said current signal and said input power to said conduit heater.

Preferably said humidifier comprises a humidification chamber adapted to receive a volume of water and water heater to heat said water to produce water vapour within said chamber in use, said gas passing through said water vapour in said chamber thereby being humidified, said instruction (a) further comprising:

- i) energising said water heater to heat said water towards a first condition,
- ii) continuously monitoring said parameter or a variable indicative of a property of said water heater, until said variable or said parameter indicates that said water has substantially reached said first condition,
- iii) determining said parameter based on at least said variable and said indication of the external temperature.

Preferably the determination of said power to said humidifier in said instruction (b) is also based on said indication of the external temperature.

Preferably said method further comprising the step of supplying gas to said humidifier at a required pressure and resulting flow rate.

Preferably said method further comprising the step of determining the level of electrical power required to supply said gas at a required pressure and resulting flow rate, from which the flow rate of said humidified gas is determined.

Preferably said gas is supplied by a fan driven by a variable speed electric motor.

Preferably said parameter is based on the current drawn by said variable speed motor.

Preferably said parameter is determined directly from a gas flow rate sensor.

Preferably said method further comprising:

sensing the temperature of said water heater and providing an indication of the electrical power drawn by said water heater,

wherein said variable is indicative of the temperature of said water heater or said indication of the power drawn by said water heater.

Preferably said method further comprising:

sensing the temperature of said water heater and providing an indication of the electrical power drawn by said water heater,

wherein said variable is indicative of the temperature of said water heater or said indication of the power drawn by said water heater.

In a third aspect the invention consists a breathing assistance apparatus adapted to deliver humidified gas at a desired level of humidity or at a desired temperature to a patient using open loop control comprising:

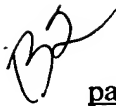
humidifier having an electrical input power and capable of humidifying said gas up to a level of humidity prior to delivery to said patient, said level of humidity depending on said input power to said humidifier,

means for determining a parameter relating to the flow rate of said gas through said apparatus;



means for determining based on at least said parameter the required electrical power input to said humidifier to deliver said gas to said patient at a level of humidity or at a temperature substantially similar to said desired level of humidity or said desired temperature;

means for supplying as said input power to said humidifier a level of power substantially similar to said determined power input to said humidifier;

 means for continuously monitoring said parameter , and when a change in said parameter is greater than a first threshold, indicating a change in the flow rate of said gas, the flow rate is determined again.

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